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The particular habitats to which reference is made in this paper include a few of the most striking and unusual ones observed in the West Indian Islands Barbados and Antigua. Observations were made and collecting was done by the writer at these places in May, June and July, 1918, at which time he was a member of the University of Iowa Barbados—Antigua Expedition.

The housing conditions on both Barbados and Antigua are in many respects entirely different from those which ordinarily obtain with us. Scarcely ever is a glass window to be seen; window and door screens are practically unknown although every bed in the homes of the white people and the better class of negroes is furnished with a mosquito net. While flies and mosquitoes are common they are not particularly troublesome. At night the lights in our quarters attracted many kinds of insects, especially moths of which the majority were Sphingids and Noctuids. From the entomological point of view this free ingress of insects proved extremely profitable.

On both Barbados and Antigua there are, especially in the cities, high walls of brick and masonry about many of the houses and lawns of the well-to-do. The Dockyard at English Harbor is protected on the land side by such a wall. Many of these walls are capped with a formidable array of heavy, broken glass bottles set in cement; some of them are so placed as to hold a considerable amount of water. While the sun is hot and the water in the bottles evaporates quickly when exposed directly to its rays, evaporation takes place much less rapidly in shaded places. Under such circumstances these containers may hold water for many consecutive days for, during the rainy season, scarcely a day goes by on Barbados that a shower does not occur. These receptacles therefore afford breeding places for mosquitoes, the filaria mosquito *(Culex fatigans)* and the yellow fever mosquito *(Stegomyia fasciata)* occurring on both Barbados and Antigua. While not a considerable number of these pests may breed in such places they only add to a situation which is none too good.

At Antigua a colony of the large brightly colored pentatomid, *Vulsirea nigrorubra* Spinola, was found upon a small tree with shining green leaves about the size of a cherry leaf. This particular kind of tree which was growing along one of the trails leading up Monk's Hill seemed to be uncommon in the region for only one or two others were discovered in our wanderings about the island. The adult insects are shining blue-black with bright crimson markings and venter, and average from one-half to five-eighths of an inch in length. The brilliant contrasty colors of the insect stand out strikingly against the leaves rendering the insect quite conspicuous. The nymphs, of which several from one-half to two-thirds grown were taken, display more of the crimson color and show up even more distinctly than the adults. Whenever a branch or twig upon which one of the insects was resting was disturbed it immediately dropped to the ground where it hid beneath the dried leaves. All the other pentatomids discovered on the island, seventeen species in all, were found upon weeds, grasses or low bushes; in fact this was the only strictly arboreal form collected on the entire trip. Of the more than sixty specimens of *V. nigrorubra* secured, but one was taken in the sweep net, the others coming from the colony on this little tree.

On the salt marshes near English Harbor, Antigua, the dark greenish tiger beetle *Cincindela trifasciata* var. *tortuosa* is found in great numbers. On account of its protective colors the insect is very difficult to see and on account of its agility on the wing is extremely difficult to catch.

At Calais beach on Barbados and again at Half Moon bay on Antigua considerable numbers of the almost pure white tiger beetle *Cincindela suturalis* var. *hebræa* were collected. At both these places are typical white coral sand beaches and the beetles are quite common. The flight of this species seems not to be so rapid as that of the preceding form and often one may bring the insects to earth with a well-aimed handful of sand. I believe that previous to our visit on Antigua this form had not been recorded from the island.

In the wooded districts about Antigua the white ants (Isoptera) are very abundant and the covered galleries which look somewhat like grayish vines extend over the branches and trunks of many of the trees. While the insects themselves are blind they seem to have an aversion for the light and so construct these galleries in which they travel from place to place. The runways are made of tiny particles of bark which are scraped from the trees by the insects and then glued together to form a hollow structure which is quite fragile although it resists weathering very well. The nests are

placed either in the trees themselves or at the bases and are more formidable structures than the galleries. Termites also are found on Barbados although they are not so common as at Antigua.

The Scotland district towards the northeastern extremity of Barbados is extremely rough and in many places the vegetation is very dense. On making the ascent from Bathsheba to Hackleton's Cliff which is about two miles from the rough coast line, one passes through a typical tropical jungle with little huts scattered here and there and a few small plots cultivated by the blacks. In these plots banana trees are not uncommon. On June 7 while examining the large reddish brown leaves at the base of one of the bunches of bananas a large yellow and black Calandrid (*Metamasius hemipterus* Linn.) was found in some numbers. As the bunches of fruit develop and become larger the leaves which formerly covered the blossom roll back thus exposing the fruit more or less. It is at the bases of these leaf rolls that the insects are usually found—one beetle to a roll but sometimes several individuals to a single bunch of bananas. If the tree be jarred or shaken the beetles drop to the ground and lie perfectly quiet for some little time. The general color of the insect is very like that of the partly dead leaves within whose coil it finds food and shelter. This beetle was not found in other situations.

One of the most interesting and, to the writer, unusual situations in which to find insects and other terrestrial arthropods was in the

Fig. 32. Epiphytes growing on manchineel trees, Antigua, British West Indies.

great "cistern epiphytes" *(Bromelia sp.)*, which grow, sometimes in great numbers, on the manchineel and other trees in the wooded districts of Antigua and to some extent of Barbados. These air plants, known locally as "wild pineapples," are the most completely epiphytic of the entire group to which they belong and are mechanically but not physiologically attached by their roots to the branches of the trees. Nutrition is brought about by absorption through the leaves which are ordinarily from two to four and one-half feet long

Fig. 30. Epiphytes and cacti in a tropical jungle, Antigua, British West Indies.

and about two inches wide. Upon carefully removing one of these "pines" from the limb to which it is rather loosely attached one usually finds more or less water held at the bases of the channeled leaves where they overlap to form a sort of pitcher. On turning the pine upside down cockroaches, spiders, scorpions, ants and beetles are pretty sure to be dislodged and in most instances mosquitoes also. Both the larvæ and adults of the latter are often found in the same plant and apparently the pest breeds in these natural reservoirs. No doubt, too, the cool moist air here is most welcome to all these arthropods during the heat of a tropical day.

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